

PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION



Initial coordinators:
Collaborators needing access to data:

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DATASET PROPOSED

LaThuile

TITLE OF PAPER AND OUTLINE

Drought impact on the Amazon rainforests

Drought impacts on the Amazon rainforests are treated as a major source for uncertainty in modeling the rainforests (Sitch et al., 2008). Forest plot based studies (Phillips et al., 2010) as well as radar remote sensing studies (Saatchi et al. 2012) find severe and persistent drought effects. Additionally, there may be a moisture stress threshold beyond which the linear moisture stress - tree mortality relationship becomes non-linear (Phillips et al., 2010).

However, there is a much more intense discussion about optical remote sensing products (Saleska et al., 2007; Samanta et al., 2010). The discussed phenomenon is dry season leaf flush, which describes canopy green-up at the end of the dry season. The question is whether it is just an artifact in the data (Galvão et al., 2011) or if it exists (Samanta et al., 2012).

Our plan is to investigate the impact of dry season timing and severity on vegetation indices from optical remote sensing. In the first part of the study we want to clarify if Amazon rainforest canopies green-up at the end of the dry season. In the second part, we want to investigate if there is a moisture stress threshold detectable with optical remote sensing. The flux tower GPP measurements will play an integral role in both parts by providing insight into ground-based GPP dynamics.

PROPOSED SITES TO BE INVOLVED

- BR-Ban 2003-2006
- BR-Cax 1999-2003
- BR-Ji2 2000-2002

- BR-Ma2 1999-2006
- BR-Sa1 2002-2004
- BR-Sa2 2001-2002
- BR-Sp1 2001-2002

PROPOSED RULES FOR CO-AUTHORSHIP

This is a MSc-thesis that is only carried out by Benjamin Brede. The supervisors Jan Verbesselt and Loïc P Dutrieux as well as the adviser Bart Kruijt also need access to the data to evaluate Benjamin Brede's outputs.

References

- Galvão, L. S. *et al.* On intra-annual EVI variability in the dry season of tropical forest: A case study with MODIS and hyperspectral data. *Remote Sens. Environ.* **115**, 2350–2359 (2011).
- Phillips, O. L. *et al.* Drought-mortality relationships for tropical forests. *New Phytol.* **187**, 631–646 (2010).
- Saatchi, S. *et al.* Persistent effects of a severe drought on Amazonian forest canopy. *Proc. Natl. Acad. Sci. U. S. A.* **110**, 565–570 (2013).
- Saleska, S. R., Didan, K., Huete, A. R. & da Rocha, H. R. Amazon forests green-up during 2005 drought. *Science* (80). 318, 612 (2007).
- Samanta, A. *et al.* Amazon forests did not green-up during the 2005 drought. *Geophys. Res. Lett.* **37**, L05401 (2010).
- Samanta, A. *et al.* Seasonal changes in leaf area of Amazon forests from leaf flushing and abscission. *J. Geophys. Res.* **117**, G01015 (2012).
- Sitch, S. *et al.* Evaluation of the terrestrial carbon cycle, future plant geography and climate-carbon cycle feedbacks using five Dynamic Global Vegetation Models (DGVMs). *Glob. Chang. Biol.* **14**, 2015–2039 (2008).